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Mare Island, Vallejo, California  
29 December 1948

DOCUMENTS SECTION

To: Medical Officer in Command

Subj: Monthly Report of the Experimental Work of the Artificial Limb Department.

Ref: (a) Advisory Committee on Artificial Limbs ltr dtd 21 June 1948. *Dec.*

1. Monthly report required by reference (a) is hereby submitted.

2. The following projects are under production, experimentation and further study:

(a) Lower Extremities Section

I. Foot and ankle.

Work is continuing on the design of the functional ankle joint utilizing a single cable. Variations of the shape, size and density of the rubber block gives allowance for variations in bumper action and resistance to load in flexion and extension and rotation. Each resistance to motion can be varied independently and concurrently to each other. An apparatus has been built in order to measure the variations allowable and to prepare curves of torque resistance and moments of flexion. The ultimate of the design is to meet the requirements as laid down by the University of California and to allow a workable range for individual patient variation.

II. Shank

A final report of the plastic shank has been prepared and will be presented at the Los Angeles conference. One hundred cases over a year's period have been studied and the results will be shown. The deficiency of the plastic shank has been corrected in a new design and this new shin will also be presented.

III. Knee

A. Mechanical

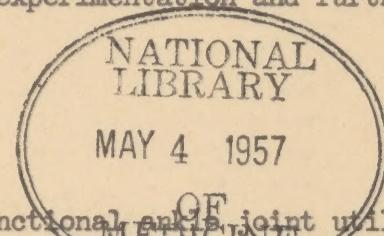
Work on a functional below knee joint is continuing. This study requires the collection of a great deal of fundamental data which is necessary in order to properly design a below-knee joint whose axis moves as the axis moves in the human knee on flexion.

IV. Cosmetic Problem

Further cases utilizing the cosmetic covering of the lower extremity are being fitted and data is being collected on the wearing quality of the cosmetic covering. Various thicknesses and densities of materials are being investigated in order to arrive at the most efficient material.

V. Brief summary of status of models as a unit.

The hydraulic tilting table prosthesis is being fitted to an amputee and is undergoing amputee testing.



Work is still continuing on the below knee suction socket and the problems of fit are difficult due to the minimum of tolerances allowable. When a below knee suction socket is fitted and workable the amputees are enthusiastic over the advantages compared to a conventional limb.

**Ib) Upper Extremities**

**I. Arms**

The functional elbow joint has been redesigned in order to increase the strength and wearing quality.

No further work has been done on the arm for disarticulation at the shoulder utilizing a shoulder joint.

The below elbow arm utilizing functional elbow joint, soft sockets, open biceps cuffs and the single harness are being used routinely and have proven to be the best below elbow arm that we have utilized up to the present time. This arm fits the greatest number of patients although special prostheses utilizing a gainer elbow joint are required for extremely short stumps.

**II. Hands, Hooks and Tools.**

The latest changes made in the Robinson articulated hand are an improvement. These include a shorter pull travel in order to close the hand which increases the power at the fingertips and the allowance for a full opening of three inches in order to comply with the minimum requirements as laid down by the University of California, Los Angeles. A hand has been sent to Major Fletcher in order for him to incorporate the Army type automatic lock. Consideration is being given at this laboratory in designing an automatic lock for the Robinson hand.

**III. Cosmetic Problem.**

No work has been done on the cosmetic problem of the arm during this month.

**IV. Harness and/or other outside control.**

The single strap harness for the above elbow arm is proving very successful and is being utilized routinely on all above elbow cases.

**V. Brief summary of status of models as a unit.**

Below and above elbow suction sockets are being used on selected cases and are working satisfactorily.

The Northrop above elbow simplex arm has been received and is being fitted to an amputee.

T. J. CANTY  
Officer in Charge  
Artificial Limb Dept.